10.

On the Uterine Young of *Dasyatis sabinus* (Le Sueur) and *Dasyatis hastatus* (De Kay).

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(Text-figures 1 & 2).

The small sting ray, *Dasyatis* (*Amphotistius*) *sabinus* (Le Sueur) is abundant along the west coast of Florida in the vicinity of the field station of the New York Aquarium on Palmetto Key. Here mature gravid females may be found at sizes not greatly exceeding those of the relatively newborn young of the much larger *Dasyatis hastatus* (De Kay).

Apparently there is a dearth of material in the literature concerning the size of gravid females, the number of young per individual and the sex ratios of the young. The catches of the stop-netters operating in Bull's Bay (Cara Pelau on the northern side of Charlotte Harbor on the U. S. coastal charts) provided the data of the accompanying tables, except as noted. The 1939 material was collected by M. B. Bishop of Peabody Museum, Yale University.

The sizes of some of the gravid females of *D. sabinus* did not greatly exceed those of the new-born young of *D. hastatus* taken on June 29. These latter ranged from 160 to 176 mm. in length, while one not quite mature male of the former was only 174 mm. long. Three full-term embryos taken from one female *D. sabinus* varied in length from 99 to 100 mm.

It can be seen that there is a steady increase in size of the embryos of *D. sabinus* from a mean of 35.8 mm. on June 19 to a mean of 99.6 on July 11. Also, there was no overlapping of the means and extremes on the various dates. If this can be taken to indicate the growth rate, on so few data, it is remarkably rapid.

If the length of the disc (from the tip of the snout to the posterior border of the disc) is compared with the width, it is seen that the two dimensions are nearly equal. Moreover, this relationship holds from the smallest embryos obtained through to the adult (Text-fig. 1), clearly showing it to be a straight line relationship. *D. hastatus*, which is a little wider than long, has a similar straight line relationship, but is not so close to a 45° angle. This is clearly a most unusually constant growth rate for which there is no superficial explanation at this time. It is not of importance in intra-uterine life nor can it be in post-uterine life when the extremely different relationships of various other species of rays, otherwise much alike, are taken into consideration. The growth relationship of these is so constant that it might be simulated to flapjack batter spreading out on a pan. Except in the early embryos, this relationship is sufficient to separate these two species which so closely resemble each other. Text-fig. 1 also indicates the relative sizes of the adults and also the size of the young at delivery.

A full-term young of each species is illustrated in Text-fig. 2 for purposes of comparison. The general shape and the presence of the keel on the tail of *D. hastatus* make separation simple. The folding in of the tail, at its origin from the body, in *D. hastatus* as compared with the flaring out in *D. sabinus* is another characteristic.

It was not always possible to identify each young fish with its mother, because in capture some of the females aborted, resulting in a mixture of mothers and young. These young, even though the yolk sac was still hanging outside the body, were able to swim around actively when placed in an aquarium. To avoid possible mistakes and confusion, the young have been considered in groups as taken. The material did show a variation in numbers of young from one to three in *D. sabinus* and from two to five for *D. hastatus*. On June 19, 1940, there was one gravid *D. sabinus* which carried but one embryo. This embryo was nearly twice the size of the others taken on the same date. However, on June 28, 1940, we took another female which carried but one embryo and this was very nearly the same size as others taken on the following day.

The sex ratios of all the embryos of *D. sabinus* combined (25) showed 56% to be male. However, one mother carried three female embryos.

TABLE I.

Size and Sex of *Dasyatis* Embryos.

Dasyatis sabinus.

Date	Disc in mm. Length	Width	Sex	Female Max.	Mean	Min.	Male Max.	Mean	Min.	All Mean
4/9/39	55	55	m)							
Captiva Pass	49	48	f)	49	49	49	55	55	55	52
6/19/40	30	29	f							
	33	32	f							
	33	30	f							
	50	53	f							
	33	30	m	50	38.5	30	33	33	33	35.8
6/28/40	78	81	m	—	—	—	78	78	78	78
6/29/40	71	72	f							
	74	77	f							
	82	81	f							
	83	87	f							
	68	69	m							
	69	67	m							
	70	71	m							
	70	73	m							
	70	74	m							
	71	72	m							
	71	74	m							
	74	75	m							
	75	76	m							
	77	79	m							
	79	81	m							
	79	81	m	83	77.7	71	79	72.9	68	75.2
7/11/40	99	99	f							
East side of Useppa Island	99	99	f							
	100	101	f	100	99.6	99	—	—	—	99.6

Dasyatis hastatus.

4/9/39	76	83	f							
Captiva Pass	75	83	f	76	75.5	75				75.5
4/10/39	97	102	m							
Captiva Pass	95	101	f	97	97	97	95	95	95	96
6/24/40	85	87	f							
	82	88	f							
	86	87	m							
	85	89	m	82	82	82	85	85	85	83.5
6/29/40	172	193	f							
	176	197	f							
	160	189	m							
	170	192	m							
	168	195	m	176	174	172	170	166	160	169.2

The relatively few young of *D. hastatus* (9) showed 55.5% to be male. Since there were in all 12 gravid *D. sabinus* and 25 embryos, they averaged 2.08 per mother. The four *D. hastatus* females averaged 3.25 per mother. These latter are much larger in relation to the size of the young they liberate; the difference in number seems to be purely mechanical.

TABLE II.

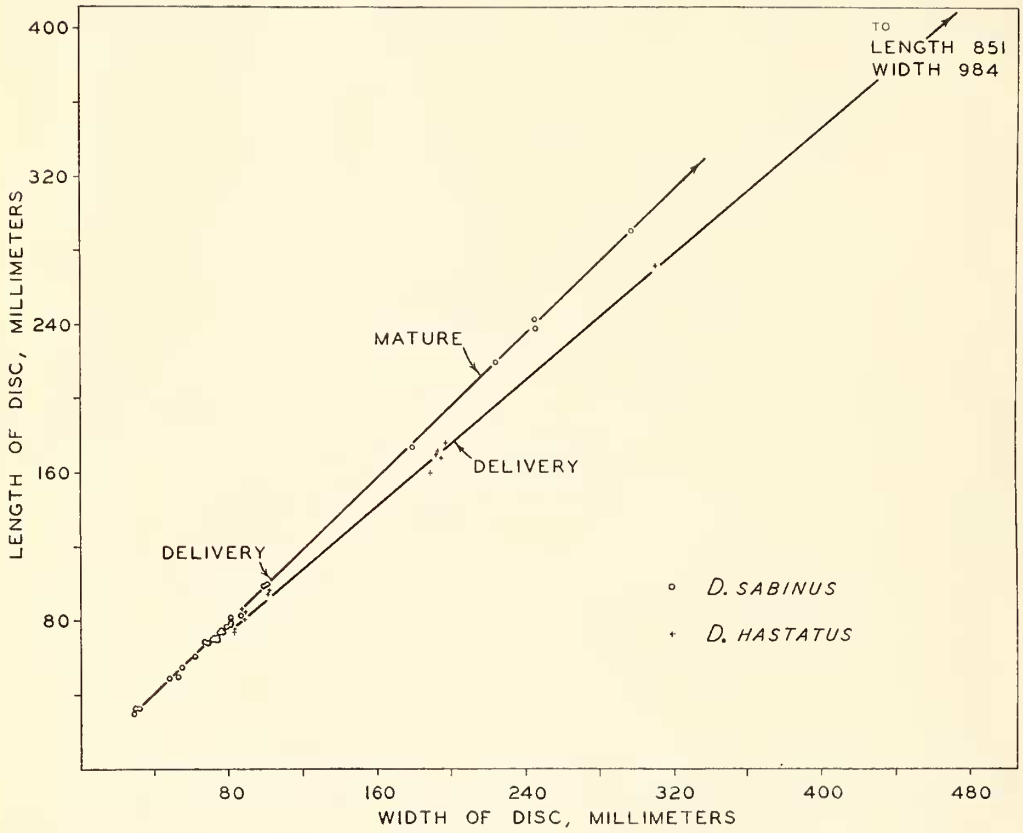
Size and Sex of *Dasyatis* Adults.

Dasyatis sabinus.

Date	Length	Width	Sex		
6/19/40	201	—	f	not gravid	
	202	—	f	not gravid	
	214	—	f	not gravid	
	222	—	f	gravid	5 embryos
	223	—	f	gravid	
	244	—	f	gravid	
Length to notch	247	—	f	not gravid	
	262	—	f	not gravid	
	190	—	m		
	190	—	m		
	199	—	m		
	213	—	m		
	218	—	m		
	234	—	m		
6/28/40	238	245	f	gravid	1 embryo
	174	179	m	imm.	
6/30/40	—	235	f	gravid	16 embryos
	—	241	f	gravid	
	243	245	f	gravid	
	—	254	f	gravid	
	—	260	f	gravid	
	—	286	f	gravid	
	—	286	f	gravid	
	220	224	m		
	—	235	m		
7/11/40	291	297	f	gravid	3 full term embryos (all females)

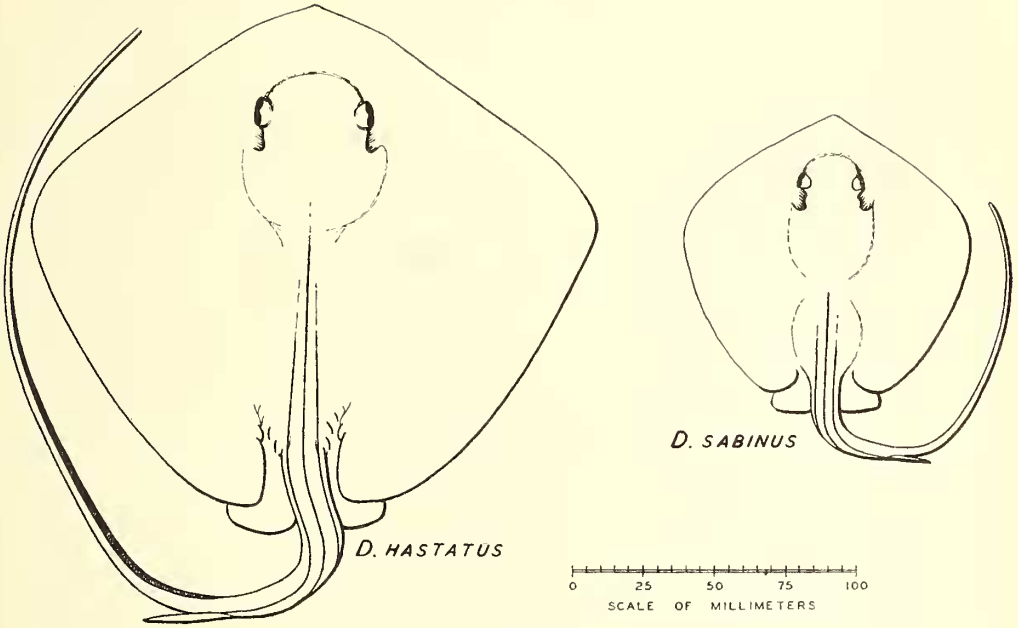
Dasyatis hastatus.

6/24/40	851	984	f	gravid	4 embryos
6/29/40	—	Circa 914	f	gravid	5 embryos
Unlabeled	272	310	f	not gravid	



Text-figure 1.

Comparison of length and width of disc in pre-natal and post-natal *Dasyatis* based on data in Tables I and II.



Text-figure 2.

Dorsal view of full-term embryos of two species of *Dasyatis*.